

REMARKS/ARGUMENTS

In response to the Office Action mailed August 8, 2005, Applicants amend their application and request reconsideration. No claims are added or cancelled so that claims 1-7 remain pending.

Claims 2 and 7 were rejected as indefinite. In response, an inadvertent error made in the Preliminary Amendment in the final paragraph of claim 2 is corrected. The original language of that claim referred to "electrodes" and clearly it was intended to refer in that second paragraph to the formation of the three electrodes mentioned in claim 1, the gate electrode, and the source and drain electrodes. The originally intended language is restored. The Examiner indicated that it was assumed that the reference to an electrode referred only to a gate electrode. This assumption was incorrect and not justified based upon the disclosure of the patent application. In view of the several errors in the prior art rejection, discussed below, the assumption did not subvert the examination.

Claim 7 was rejected as unclear with respect to the mechanism of transmission of the nitrogen through the insulating film or aluminum film. Of course, it is not necessary to recite the mechanism in the claim and it is not understood how the Examiner could have assumed that the mechanism is ion implantation. As discussed below, ion implantation requires ions. The method disclosed and claimed in the patent application uses atomic nitrogen, nitrogen that has a neutral electrical charge. A charge is required for an ion to be accelerated so that it can be implanted by ion implantation. In any event, claim 7 is amended to correct an error of antecedent basis and for clarity. Further, claim 6 is amended to recite that the insulating or aluminum film is very thin, namely having a thickness in a range between 10 and 50 Angstroms. This description is taken directly from the patent application in the passage from page 15, line 23 through page 16, line 4. It is apparent to those of ordinary skill in the art that a film so thin would permit the transmission, for example, by diffusion, of atomic nitrogen to reach the surface that is covered by the insulating or aluminum film. Claim 7 was not and is not indefinite, particularly in view of the amendment of claim 6.

Claims 1, 2, and 4 were rejected as anticipated by Makita et al. (U.S. Patent Publication 2004/0192043, hereinafter Makita). Claims 3 and 5 were rejected as unpatentable over Makita in view of Melas (U.S. Patent Publication 2005/0136627). Claim 6 was rejected as unpatentable over Makita in view of Kikkawa (U.S. Patent Publication

2004/0144991). The rejections listed in this paragraph are all traversed because they are both legally and factually erroneous.

None of Makita, Melas, or Kikkawa is prior art to the present patent application. To the extent the U.S. filing dates of those publications are earlier than the filing date of the present patent application, it is apparent that the effective dates of those publications are all after the priority date of the present patent application. In perfection of their priority claim, Applicants submit, pursuant to 37 CFR 1.55, a certified English language translation of the priority patent application, Japanese Patent Application 2003-131263, filed May 9, 2003. Comparison of the certified English language translation to the present patent application shows that the disclosures are essentially identical. Thus, all three of Makita, Melas, and Kikkawa must be withdrawn as prior art publications. As a result, no prior art rejection of the Office Action can properly be maintained.

Even if it were assumed that Makita, Melas, and Kikkawa could be relied upon as prior art, those publications do not provide a factual basis for rejecting any pending claim.

Claims 1 and 4 describe processes that include, among other steps, the generation of atomic nitrogen in a catalytic reaction. In order to anticipate those claims as well as dependent claim 2, Makita would have to describe, identically, the process of each of those claims. Makita never describes generating atomic nitrogen in a catalytic reaction. At best, Makita, particularly in the portions relied upon by the Examiner, describes forming a plasma that may include nitrogen. Even if it is assumed that a plasma might be considered to be a catalytic reaction, which is extremely doubtful, nitrogen ions might be formed in the plasma but it is unlikely that atomic nitrogen would be formed. Thus, Makita fails to describe generation of atomic nitrogen and the contacting of a surface with atomic nitrogen to nitride the surface. On this ground alone, Makita, if prior art, could not anticipate any of claims 1, 2, and 4.

Further, according to the processes of claims 1 and 4, only after forming gate, source, and drain electrodes is there any nitriding of any surface. This arrangement is contrary to Makita. Initially, in Makita, source and drain electrodes 26 and 28 are formed and only thereafter, following the complex processing including plasma-treating of the surface, is the gate electrode 38 formed on that treated surface. Clearly, on this additional ground, Makita, if prior art, cannot anticipate any of claims 1, 2, and 4.

Further, Makita could not anticipate claim 2, if prior art, because that claim describes forming all three electrodes on a surface that has been nitrided. The source and drain electrodes in Makita are not formed on surfaces that have been subjected to plasma-treating.

The rejection of claims 3 and 5 as obvious is erroneous because it relies upon the propriety of the rejection for anticipation of claims 1 and 4 by Makita. As shown above, if Makita were prior art, it would not anticipate either of claims 1 and 4. Thus, even if Melas were prior art, the rejection of claims 3 and 5 would have to be withdrawn.

In addition, Melas does not stand for the proposition for which the Examiner cited Melas. Melas does not describe forming a layer of aluminum. Rather, Melas describes forming a semiconductor material that includes a metallic component. The metallic component is identified in paragraph [0017] of Melas as potentially being aluminum. However, what is deposited is a compound semiconductor material, such as aluminum nitride, not metallic aluminum. No one of skill in the art would ever assert that metallic aluminum and aluminum nitride are the same. For this additional reason, the rejection of claims 3 and 5 must be withdrawn.

The rejection of claim 6 is erroneous for the multiple reasons already described. Neither Makita nor Kikkawa is prior art to claim 6. Neither Makita nor Kikkawa describes decomposing nitrogen in a catalytic reaction to produce atomic nitrogen nor the production of atomic nitrogen by any process. Neither Makita nor Kikkawa describes first forming a gate electrode and thereafter nitriding the surface that remains exposed but on which the gate electrode was formed. To extent Kikkawa describes depositing a film on a field effect transistor structure, in paragraph [0050], there is no description of the thickness of that film. There is no suggestion that the film is sufficiently thin, as in the process of claim 6, to permit the transmission of atomic nitrogen through the film. Moreover, no motivation has been found for modifying Makita with this insulating film depositing step of Kikkawa, a critical element in demonstrating *prima facie* obviousness. For all of these reasons, considered independently and in combination, claim 6 cannot be obvious in view of any proper modification of Makita with Kikkawa, even if either of those publications were prior art to the present patent application.

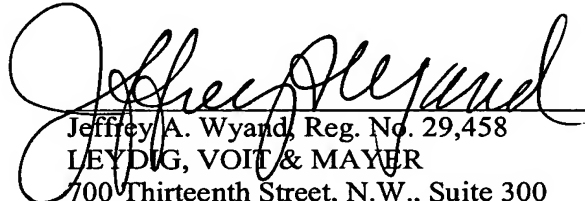
Claim 7 was rejected as obvious over Makita in view of Kikkawa and further in view of Nguyen et al. (U.S. Patent 5,766,695, hereinafter Nguyen). This rejection is respectfully traversed.

Since claim 7 depends from claim 6, the rejection is erroneous for all of the reasons that the rejection of claim 6 is erroneous. Those reasons are incorporated by reference and not repeated in detail. In addition, as previously explained, Nguyen concerns ion implantation, a process that has no relationship to the process that is claimed in claims 6 and 7. The process claimed concerns the generation of uncharged atomic nitrogen that diffuses through an extremely thin layer of aluminum or an insulator to reach and nitride the surface of an underlying material. The process described and claimed is an electrically neutral process. By contrast, ion implantation requires the stripping of electrons from nitrogen and the acceleration of the resulting nitrogen ions in an electric field so that the accelerated ions impact and become buried in a target material. Nguyen fails to describe a diffusion process as in the invention and, therefore, no matter how Makita and Kikkawa might be modified by Nguyen, the result cannot be the claimed invention. Further, motivation for modifying Makita and Kikkawa with even an ion implantation step has not been demonstrated so that the rejection is fundamentally legally erroneous without even considering the inapplicability of the non-prior art primary and secondary references.

In this Amendment, although three claims have been amended, there has been no amendment of four of the claims and no amendment in response to the prior art rejections. Accordingly, any new rejection based upon newly applied prior art or new legal grounds cannot properly be a final rejection.

Reconsideration and allowance of all of claims 1-7 are earnestly solicited.

Respectfully submitted,


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